

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WILLIAM M. SCHWARZ

Appeal No. 1998-3281
Application 08/650,500¹

ON BRIEF

Before METZ, WARREN and TIMM, Administrative Patent Judges.
METZ, *Administrative Patent Judge*.

DECISION ON APPEAL

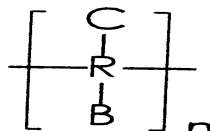
This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 3 through 15, 17 through 20 and 22. Claims 16 and 21, the only other pending claims in this application, were indicated as allowable by the examiner in his advisory action mailed on June 4, 1998 (Paper Number 9).

THE INVENTION

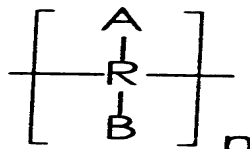
The appealed subject matter is directed to a "process" for placing in an ink jet apparatus an ink composition comprising water, a colorant and a polymer bearing both hydrophobic groups and hydrophilic groups.

Independent claim 22 is believed to be adequately representative of the appealed subject matter and is reproduced below for a more facile understanding of appellants' invention.

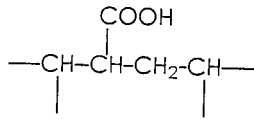
Claim 22. A process which comprises incorporating into an ink jet printing apparatus an ink composition which comprises water, a colorant, and a polymer selected from (a) those of the general formula



wherein **R** is an organic group having at least two carbon atoms, **C** is a hydrophobic saturated alkyl group having at least about 6 carbon atoms bonded in a linear chain, **B** is a hydrophilic group containing at least about 9 atoms bonded in a linear chain, and **n** is an integer representing the number of repeating monomer units; or (b) those of the general formula



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A is a hydrophobic group having at least about 6 atoms bonded in a linear chain, **B** is a hydrophilic group containing at least about 9 atoms bonded in a linear chain, and **n** is an integer representing the number of repeating monomer units, and causing droplets of the ink to be ejected in an imagewise pattern onto a substrate.

THE REFERENCES

The reference of record which is being relied on as evidence of obviousness is:

Beach et al. (Beach) 5,589,522 December 31, 1996

THE REJECTIONS

Claims 3 through 15, 17 through 20 and 22 stand rejected as being unpatentable under 35 U.S.C. § 103 from the disclosure of Beach.

OPINION

We begin with a determination of the scope and content of the appealed claims. While we agree with the examiner that appellant's claims are not a model of clarity, they can be read,

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appellant's claims reasonably may be said to embrace. See In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970) ("If no reasonably definite meaning can be ascribed to certain terms in the claim, the subject matter does not become obvious the claim becomes indefinite."). Compare In re Steele, 305 F.2d 859, 862-63, 134 USPQ 292, 295 (CCPA 1962).

Specifically, claim 22 defines a "polymer" selected from two groups of polymers defined by their formulae. The polymers denominated as group (a) include a backbone **R** defined solely as an "organic group" having two or more carbon atoms in the repeating unit. One substituent on the backbone is represented by the substituent **C**, the universally recognized symbol for carbon, although **C** in at least part of appellant's claim does not stand for carbon! Rather **C** is stated to be "a hydrophobic saturated alkyl group having at least about 6 carbon atoms bonded in a linear chain." The second substituent on the backbone is represented by the substituent **B**, the universally recognized symbol for boron, although **B** does not stand for boron in the appealed claims! Rather, **B** is stated to be a "hydrophilic group

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Alternatively, the polymer in claim 22 may be polymer (b) which is defined by a backbone **R** as in polymer (a) but the backbone is itself defined by a particular structure recited in claim 22 and is a four carbon, linear, saturated chain having a carboxylic acid moiety attached to the number 2 carbon in the chain. In the formula depicting **R** in polymer (b), **C** is not a hydrophobic saturated alkyl group having at least about 6 carbon atoms bonded in a linear chain but is, indeed, carbon. A first substituent **A** on the (b) polymer is defined as a "hydrophobic group having at least about 6 atoms bonded in a linear chain." A second substituent **B** (not boron) is defined as a "hydrophilic group containing at least about 9 atoms bonded in a linear chain." The subscript **n** in polymer (b) is an integer representing the number of repeating monomer units in polymer (b).

Reading this claim standing alone, we agree with the examiner's conclusion that it is of considerable scope. However, this, in and of itself, is not a basis for rejection. U.S. Steel Corp. v. Phillips Petroleum Co., 865 F.2d 1247, 1251, 9 USPQ2d

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such claims on prior art not reject them under the second paragraph of the statute.

Further, we find the use of the symbol **C**, the universally accepted symbol for carbon, to mean something other than carbon in one part of the claim and to also use **C** in its ordinary well accepted sense in another part of the same claim to mean carbon to be extremely confusing. Similarly, the use of the universally accepted symbol for boron **B** to mean something other than boron is extremely confusing. Nevertheless, the language is in part defined in appellant's specification and in the claims themselves. We say in part defined because the use of the symbol **C** as defined in claim 22 is not found in appellant's original disclosure Claim 22 was added by the amendment of March 30, 1998, Paper Number 6.² The polymers described as polymer (b) are described in appellant's original disclosure in both the specification and original claims. We cannot say that the terminology is conventional but it is defined.

It has been held that an applicant for patent may be his own lexicographer so long as an applicant for patent clearly sets

different from the conventional, art-recognized definition.

Beachcombers, Int. v. WildWoode Creative Products, Inc. 31 F.3d 1154, 1158, 31 USPQ2d 1653 (Fed. Cir. 1994); ZMI Corp. v. Cardiac Resuscitator Corp., 844 F.2d 1576, 1579, 6 USPQ2d 1557, 1560 (Fed. Cir. 1988); Envirotech Corp. v. Al George, Inc., 730 F.2d 753, 759, 221 USPQ 473, 477 (Fed. Cir. 1984). As we have concluded above, appellant has certainly set forth the meaning they intend for their claim language at least with respect to polymer (b).

Appellant discloses that useful polymers for his ink composition include the "comb polymers" described on page 17, line 3 through page 23, line 5. Thus, the polymers bear both a hydrophobic and a hydrophilic moiety on the polymer backbone and the substituents need not be bonded to the same carbon on the backbone (page 17, lines 23-24). Exemplary hydrophobic moieties are hydrocarbons containing from 6 to about 22 carbon atoms bonded in a linear chain (page 17, lines 14 through 17). Exemplary hydrophilic moieties include moieties with at least about 9 atoms bonded in a linear chain (page 17, lines 18 through

hydrophobic to enable dispersion of the pigment in the ink

vehicle and the hydrophile is sufficiently hydrophilic to enable the polymer to be soluble in the ink vehicle (page 18, lines 6 through 10). The repeating unit of polymer (b) has an HLB (hydrophile/lipophile balance) of from about 8 to 30 (page 18, lines 10 through 13). Useful molecular weights for polymer (b) may be as high as 500,000 or as low as dimers of the monomers defining polymer (b) with preferred molecular weights from about 2,000 to about 50,000 (page 18, lines 17 through 25). On page 21, appellant discloses that useful (b) polymers are commercially available as the proprietary product known as **DAPRAL GE 202**, available from Akzo Chemie America, Chicago, Illinois. The prior art cited by appellants at pages 5, 6 and 7 of the specification show **DAPRAL GE 202** to be a an ethoxylated maleic anhydride/alpha-olefin copolymer and to have been commercially available at least since 1992. All appellant's examples utilize **DAPRAL GE 202** as the polymer in appellant's ink composition and the polymer claimed in claims 16 and 21 is **DAPRAL GE 202**.

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carbon atoms bonded in a linear chain and a hydrophilic group containing at least about 9 atoms bonded in a linear chain and

embraces **DAPRAL GE 202** as the useful polymer (b). It is against this background that we shall review the prior art applied by the examiner against the appealed claims under 35 U.S.C. § 103.

We agree with the examiner that Beach discloses a polymer useful in an ink composition useful for an ink jet printing process. As correctly observed by the examiner, the ink composition comprises water, a pigment and a graft copolymer comprising both a hydrophilic segment and a hydrophobic segment. According to Beach, while the prior art had used dispersants to maintain pigments in dispersion in prior art ink jet inks, it is their dispersants which enable the dispersions to remain in dispersion for long periods of time without the pigment separating out and clogging the ink jet apparatus. Beach discloses as useful hydrophobic segments reaction products of carboxylic acid moieties with a hydrophobe, such as with an amine, to form an amide. The hydrophilic segment in Beach is

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least 6 carbon atoms" and a hydrophobic segment comprising "two carboxylic acid groups which are hydrophilic groups." Page 3 of the Answer. The examiner also finds other groups depicted in

Beach's claims meet appellant's requirements for a polymer having a combination of both hydrophilic and hydrophobic groups. The examiner concludes that because Beach discloses such dispersants as useful for dispersing pigments in ink jet inks that it would have been *prima facie* obvious to use the ink compositions of Beach in an ink jet printing apparatus, thus rendering the claimed subject matter unpatentable under 35 U.S.C. § 103.

We find that Beach is directed to polymers having a polyacrylic acid, polymethacrylic acid or polyethyleneimine backbone which are "functionalized" by grafting on the backbone various moieties which form pendant hydrophobic groups on the backbone. However, while appellant's claims require that it is the hydrophilic group on the backbone which has 9 or more atoms bonded in a linear chain the pendent group on the backbone in claim 5 of Beach does not, as appellant has argued, have at least

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hydrophilic and hydrophobic moieties thereon. We do not find such polymers described or suggested in Beach although Beach does suggest the usefulness of dispersants having both hydrophilicity and hydrophobicity for dispersing pigments in ink compositions.

Accordingly, we shall reverse the examiner's rejection because Beach would not have rendered obvious the subject matter of claim 22 wherein the polymer used in the ink composition is the (b) polymer.

REJECTION UNDER 37 C.F.R. § 1.196(b)

Pursuant to our authority under 37 C.F.R. § 1.196(b)(1997), we enter the following new ground of rejection with respect to claims 3 through 22.³

Claims 3 through 22 are rejected under 35 U.S.C. § 103 as the subject matter claimed thereon would have been unpatentable from the disclosure in Ohta et al. (Ohta), Matrick or Ma et al. (Ma), any considered with Krüger et al. (Krüger) or Xu et al. (Xu). Ohta, Krüger and Xu are cited by appellant in his specification and copies of same are of record. Matrick and Ma,

previously cited by the examiner are also, of record.

Ohta discloses an ink composition useful in an ink jet apparatus for ink jet recording (column 1, line 17 through column 2, line 27). Ohta utilizes an ink jet ink which uses a pigment rather than a dye. Ohta recognizes that because the pigments are normally insoluble in the medium used for the ink special techniques are required to disperse the pigments and maintain the dispersion (column 3, lines 10 through 63). Ohta discloses that the use of a polymeric dispersing agent having both a hydrophilic and hydrophobic portion enable the preparation of stable dispersions of pigments used to make ink jet ink compositions (column 3, lines 64 through 68). Representative pigments include carbon black (column 7, lines 23 through 28). The inks prepared from said dispersants have numerous beneficial properties (column 7, line 56 through column 8, line 5).

Ma discloses aqueous dispersions useful as aqueous ink jet compositions comprising water, a pigment and a polymeric dispersant (column 2, lines 25 through 46). Useful polymeric dispersants have both hydrophilic sections and hydrophobic

lines 31 through 52).

Matrick discloses an aqueous ink jet composition comprising an aqueous carrier or medium, a pigment, a nitrogen heterocyclic diol cosolvent and a polymeric dispersant which may be used in place of the dispersant ordinarily used to disperse the pigment

particles (column 2, line 50 through column 8, line 29). Useful polymeric dispersants include those bearing both hydrophilic blocks and hydrophobic blocks. The hydrophobic blocks serve to link with the pigment particles and the hydrophilic particles disperse the particles to which the hydrophobic block is linked in the aqueous medium (column 8, line 31 through column 12, line 25). Other conventional additives may be incorporated into the ink composition (column 14, line 17 through column 16, line 52).

Krüger discloses a group of polymeric dispersants known as "comb copolymers". A line of copolymers made by Akzo Chemicals and known as the **DAPRAL** line is described as commercially available and especially suitable to disperse/stabilize polar disperse phases in lower polarity vehicles, including inorganic

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Xu discloses that hydrophobic graphite particles may be dispersed in aqueous media by using comb-like polymers with both hydrophilic and hydrophobic side chains. Specifically, Xu found **DAPRAL GE 202** polymers obtained from Akzo Chemie America which are ethoxylated maleic anhydride-alpha-olefin copolymers to be useful. Xu recognized that the hydrocarbon chains on the polymer adsorbed on the graphite through hydrophobic interaction leaving the ethoxylated chain to extend into solution. The polymers were found to stabilize colloidal suspensions of graphite particles in aqueous media.

We observe that although appellant's claims are couched in terms of being claims to a process, the "process" comprises "incorporating" into an apparatus a particular composition. Thus, although nominally "process" claims, the apparatus recited in the claims and the method of using same were, as shown by the extensive prior art in this proceeding, exceedingly well-known in the art at the time appellant's made their invention. Accordingly, the question of obviousness here revolves around

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skilled with a sound working knowledge of chemistry, materials science, physics and engineering. We are also satisfied that said hypothetical person of ordinary skill would have been motivated to use the well-known, commercially available family of dispersant polymers known as **DAPRAL**'s and, specifically, **DAPRAL GE 202**, as the polymeric dispersant in any of Ohta, Matrick or Ma because each of said references recognizes the suitability of

polymeric dispersants with hydrophobic and hydrophilic segments in preparing ink jet ink compositions and **DAPRAL**'s bear both hydrophilic and hydrophobic moieties on the backbone of a repeating segment. The motivation would also derive from the polymer's well-understood mode of operation, that is, by attachment of the hydrophobic segment to the pigment particle with the hydrophilic segment attached thereto solubilizing the pigment in aqueous solution. Still further, the routineer would have reasonably expected the **DAPRAL GE 202** to be useful in view of the success reported in dispersing colloidal graphite or carbon black in both Krüger and Xu. Moreover, Krüger

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weight of **DAPRAL GE 202**, we also find the specific limitations in the dependent claims would have been obvious from the suggestion in the prior art to use **DAPRAL GE 202** as a polymeric dispersant for graphite pigments (colorants) used in ink jet ink compositions. Both Ma and Matrick disclose that their ink compositions would be useful in thermal ink jet printers. Accordingly, the limitation in claim 20 of using the inks in a thermal ink jet process is also suggested by the combination of the prior art on which we rely.

OTHER ISSUES

In the event appellant pursues the subject matter of this application in another application, he must supply to the examiner any product information or product sheets of which he is aware or may possess which describe the proprietary products and the uses for **DAPRAL**'s manufactured by Akzo Chemie. The examiner and appellant should determine whether or not the newly added formula for polymers defined by the structure (a) in claim 22 is adequately "described" in the original disclosure in view of the

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The rejection of claims 3 through 15, 17 through 20 and 22 as being unpatentable under 35 U.S.C. § 103 from the disclosure in Beach, is reversed. We have made a new ground of rejection under 37 C.F.R. § 1.196(b), including a rejection of claim 16 and 21, claims previously indicated as allowable by the examiner.

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 C.F.R. § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 C.F.R. § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

REVERSED
37 C.F.R 1.196(b)

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